

### **REMARKS**

The present invention is a method for measuring a wettability of a porous rock sample in the presence of water and oil. In accordance with the preferred embodiments of the present invention, the method comprises determining a water wet pore surface of the sample  $SM_w$  and an oil wet pore surface of the sample  $SM_o$  when the sample is saturated with water and oil, and calculating a wettability index  $I_{NMR}$  from a combination of the water wet pore surface and the oil wet pore surface obtained. In accordance with the preferred embodiments, the wettability index may

be obtained from the relationship  $I_{NMR} = \frac{SM_w - SM_o}{SM_w + SM_o}$  or from the relationship

$I_{NMR} = \log_{10} \frac{SM_w}{SM_o}$  where  $SM_w$  is the water wet pore surface and  $SM_o$  is the wet pore surface when the porous rock sample is saturated with water and oil.

At the outset, it should be noted that a Preliminary Amendment was filed on March 10, 2005 with the original application papers which presented claims 1-20 for examination. A photocopy of that amendment and a postcard receipt showing filing in the United States Patent and Trademark Office is submitted herewith. It is requested that the Examiner place the aforementioned Preliminary Amendment in the file. Moreover, the claims as amended have been renumbered from the claims as presented in the Preliminary Amendment to start from new claim 21.

Claims 1-9 stand rejected under 35 U.S.C. §102 as being anticipated by United States Patent 5,162,773 (Baldwin). With respect to claim 1, the Examiner

reasons as follows:

With respect to claim 1, Baldwin in the US Patent 5,162,733 discloses a method for measuring the wettability (sic) of a porous rock sample in the presence of water and oil, characterized in that it comprises determining the water wet pore surface and the oil wet pore surface when the sample is saturated with water and oil, and calculating the wettability index by combination of the values obtained for said surface (Abstract, columns 2 and 9, lines 45-50 and 40-30).

These grounds of rejection are traversed for the following reasons.

It is noted that the Examiner has relied upon the Abstract, column 2, lines 45-50, and column 9, lines 40-30. The reference to column 9, lines 40-30, is an obvious typographical error, but it is unclear from the record what the correct reference is. It is required that the Examiner supplement the record with the correct reference.

Baldwin discloses a method for determining the relative wettability of a sample of a porous media. The method is described in the Detailed Description of the Invention in column 2 as pertaining to a core plug containing to oil and water.

Claim 21 recites:

A method for measuring a wettability of a porous rock sample in a presence of water and oil, comprising determining a water wet pore surface of the sample and an oil wet pore surface of the sample when the sample is saturated with water and oil, and calculating a wettability index from a combination of the water wet pore surface and the oil wet pore surface.

As may be seen from claim 21, the steps of measuring the wettability of a porous rock sample in the presence of oil and water are (1) determining a water wet pore surface of the sample and an oil wet pore surface of the sample when the sample is saturated with oil and water and (2) calculating a wettability index from a

combination of the wet pore surface and the oil wet pore surface. It is submitted that Baldwin's methodology as described, for example, in the Abstract is different than the claims in that Baldwin's method provides a sample at a partially saturated state with respect to a first liquid; obtains a first nuclear magnetic resonance (NMR) parameter value for the partially saturated sample; exposes the partially saturated sample to the second liquid for a predetermined period of time wherein the second liquid is treated with a parametric species such that the species of the second liquid in the sample does not substantially affect the NMR signal response of the sample; obtains a second NMR parameter value of the sample after exposure to the second liquid; and determines the relative wettability by comparing the first and second NMR parameter values. It is submitted that there is no counterpart of the first and second steps, as recited in claim 21 in Baldwin, since there is no counterpart in Baldwin of the water wet pore surface and the oil wet pore surface index.

The methodology of Baldwin is fundamentally different and does not determine a water wet pore surface and an oil wet pore surface and therefrom calculating a wettability index from a combination of the water wet pore surface and the oil wet pore surface. If the Examiner persists in this stated ground of rejection, it is requested that he point out on the record precisely what he considers Baldwin's water wet pore surface and the oil wet pore surface of the porous sample to be and further, how the wettability index is calculated from a combination of the water wet pore surface and the oil wet pore surface as recited in claim 21.

In contrast, the determination of wettability by Baldwin is determined by comparing first and second NMR parameter values which are not calculated utilizing the aforementioned water wet pore surface and oil wet pore surface of the sample

followed by calculating a wettability index from a combination of the water wet pore surface and the oil wet pore surface as recited in claim 21.

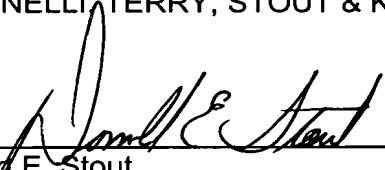
Dependent claims 22-41 recite further aspects of the present invention which are neither anticipated nor rendered obvious by Baldwin.

In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (612.44794X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Attachments

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